Revised 5/00

CORRES. CONTROL
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BACA, T.		
BOGENBERGER, V.		
BRAILSFORD, M.D.		
CARD, R.G.		
COX, C.M.		
CRAWFORD, A.C.		
DERBY, S.		
DIETERLE, S.E.		
FERRERA, D.W.		
FERRERA, K.P.		
FERRI, M.S.		
FULTON, J.C.		
GERMAIN, A.L.		
GIACOMINI, J.		
HEDAHL, T.G.		
ISOM, J.H.		
LEONARD, R.C.		
MARTINEZ, L.A.		
NORTH, K.		
PHILLIPS, E.J.	✓	
POWERS, K.P.		
RODGERS, A.D.		
SANDLIN, N.B.		
SCOTT, G.K.		
SHELTON, D.C.		
SPEARS, M.		
TRICE, K.D.		
TUOR, N.R.		
VOORHEIS, G.M.		
WARTHER, R.F.		
Butler, K ✓		
Greengard ✓		

COR. CONTROL	X	X
ADMN. RECORD		
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Reviewed for Addressee
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Department of Energy

ROCKY FLATS FIELD OFFICE
10808 HIGHWAY 93, UNIT A
GOLDEN, COLORADO 80403-8200

MAY 23 2000

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Mr. Steven Gunderson
Rocky Flats Cleanup Agreement Project Coordinator
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

Dear Mr. Gunderson:

Enclosed please find our responses to the Colorado Department of Public Health and Environment comments on "The Status Report for Monitoring of Natural Attenuation at Individual Hazardous Substance Site 118.1, August 1999." We have incorporated your comments provided verbally to our staff on May 1, 2000, in a comment response sheet. Therefore, we will not revise the report but will submit the changes to the Administrative Record. This report summarized the sample results for the suite of analytes that were sampled in the first sampling round and determined whether the suite should be modified given the results obtained.

If you should have any questions related to these responses, please contact Norma I. Castaneda at (303) 966-4226 or contact me at (303) 966-5198.

Joseph A. Legare
Assistant Manager
for Environment and Infrastructure

Enclosure

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C. Spreng, CDPHE
E. Potoroff, CDPHE
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IA-A-000576

RESPONSE TO CDPHE COMMENTS ON THE DRAFT FINAL TECHNICAL MEMORANDUM FOR MONITORED NATURAL ATTENUATION OF THE PU&D YARD VOC PLUME

This paper has been prepared by Rocky Flats (the Site) in response to comments from the Colorado Department of Public Health and Environment (CDPHE) dated February 7, 2000. The comments pertain to the draft final Technical Memorandum (TM) for Monitored Natural Attenuation of the PU&D Yard VOC Plume dated December, 1999. The U.S. Environmental Protection Agency (EPA) did not have comments on the document.

As agreed to in a telephone conversation between Norma Castaneda of the U.S. Department of Energy (DOE), Tom Greengard of SAIC and the Kaiser-Hill Team, and Elizabeth Pottorff of CDPHE on April 6, 2000, the Site will incorporate CDPHE comments on the PU&D Yard TM in the PU&D Yard Sampling and Analysis Plan (SAP) and will not revise the TM. The draft SAP will be available for review by CDPHE and EPA in July, 2000.

Responses to specific comments are presented below.

CDPHE Comments:
Section 2.4 contains a sentence that epitomizes the problem with this document. "The distribution of individual PU&D Yard contaminants of concern is more complex than depicted by the composite plume map". In order to consider Monitored Natural Attenuation (MNA) the site must be able to explain to the regulators the pathways and attenuation mechanisms of transport. The source(s) need to be understood as well as possible. Mapping of the individual plume contaminants is complicated but necessary to this explanation. There appear to be at least 3 sources contributing to this plume.

Response: The Site has identified and mapped the individual constituents of the PU&D Yard Plume. Major VOC constituents of the composite groundwater VOC plume will be contoured and presented in the PU&D Yard SAP.

It would appear there is a pathway through the slurry wall between B206589 and 7287 and that flow is out of the Landfill rather than the possibility mentioned that a small fraction of groundwater breaches the intercept and diversion system and enters the Landfill. What flow and quality measurements are made at SW097 that would indicate the latter?

Response : The Site's interpretation of groundwater flow and PU&D Yard plume movement into (rather than out of) the Landfill is based on the following conditions:

- Water level elevations at wells 7287 and B206489 (south of the slurry wall) are approximately 4 feet higher than at well B206389 (north of the slurry wall), indicating a hydraulic gradient across the slurry wall toward the Landfill.
- Concentration gradients of selected inorganic contaminants (chloride, bicarbonate, iron, manganese, and total dissolved solids) presented in the *1995 Groundwater Geochemistry Report* (Chapter 6 UHSU Figures) indicate the type of pattern that would be expected for a groundwater flow direction toward the center of the Landfill. As groundwater travels through refuse, the concentration of these contaminants would be expected to increase along the flow path. For groundwater to flow south out of the Landfill, we would expect to see an opposite pattern, (i.e., concentrations would be higher at the south margin than at the Landfill center).
- Parameters indicative of Landfill leachate, such as found at well B206389 (elevated iron, manganese, total organic carbon, TDS, etc.), are not detected in significant concentrations at wells 7287 and B206489.

Why is information from the IHSS investigation not included in this report? A grab sample of water from borehole 17497 appears to have the highest concentrations of PCE in the area at 1700 ug/l. Detection levels for the other PU&D Yard contaminants in this sample were greater than 250 ug/l and so it is not

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possible to tell if this is actually the main source of the PU&D Yard plume (containing TCA). Why was this boring not completed as a well?

Response: The information from the PU&D Yard source characterization is in "Data Summary Report for IHSSs 170, 174A and 174B, Property Removal and Storage Yard", and was referenced in the TM. Table 2-3 from this report will be included in the SAP along with the locations of the boreholes. The borehole was not completed as a well because it was installed as part of the PU&D Yard source characterization project. Per the SAP for that project, a "grab" sample was obtained if water was encountered in a borehole.

At the bottom of Page 11 it is stated that "Because multiple sources may contribute to composite plume shape and extent, these parameters cannot be used to provide reliable indicators of plume migration rate away from the PU&D Yard area". It is not clear which parameters this statement refers to. A thoughtful examination of the concentration data with knowledge of the groundwater flow directions should give a pretty good picture of the source area and migration direction. A check of the seasonal ground water flow directions and detailed evaluation of the potentiometric source map may be necessary to ensure a good evaluation.

Response: If there are multiple sources for the composite plume, the nature and extent of the VOCs from those sources become more complicated as the plumes become co-mingled. The parameters referred in the TM are TCE, PCE, DCE and carbon tetrachloride. The statement in the TM was intended to mean that more information was needed to quantify both the flow path and extent than could be determined from the existing conceptual model for the plume. The SAP will be designed to acquire the additional information and refine the conceptual model.

Section 2.5 suggests several attenuation processes may apply to this plume, therefore determination of a specific mechanism of attenuation is not critical. If a reasonable conceptual model can not be developed for this plume then it should not be considered for MNA. An MNA remedy presumes enough analysis and monitoring will be done to understand that the plume will never impact a receptor.

The TM acknowledges that certain key parameters are not available in the PU&D Yard data set. Therefore, the available data cannot be used to completely determine the nature of the natural attenuation process. The SAP will include key biodegradation parameters so that a determination can be more easily made of the specific mechanisms of natural attenuation for the PU&D Yard plume constituents.

Well 7287 shows increasing contaminant trends, possibly from within the land fill. It is not clear from the available data if the PU&D plume reaches this area of if there is a change in ground water flow direction and contaminant movement.

Response: Well 7287 was last sampled in 1994 and is abandoned. Contaminant trends for TCE, PCE and Carbon Tetrachloride show widely scattered values for 1993 and 1994, with some values that are higher than the historic mean plus two standard deviations. Though typically higher in concentration for these VOCs than nearby wells, the values are within the same order of magnitude as other wells in the PU&D yard plume, and the contaminants are consistent with those found associated with the PU&D Yard. The plume configuration seen in individual contaminant plots does suggest a more northern trend than observed farther to the west, but as discussed in our response to a previous comment, there is no evidence that the VOCs are coming from the direction of the Landfill. Individual contaminant plots for the major VOCs will be included in the SAP.

The conclusion that the plume should be monitored in selected wells and drain outfalls at and beyond the leading edge of the plume is good except the leading edge of the plume is not well defined by this Technical Memorandum. After an appropriate analysis is made, a conceptual model defined, and data gaps identified and resolved, then it will be appropriate to select long-term monitoring locations.

Response: The Site agrees with this comment. The PU&D Yard Plume SAP will propose additional well locations to better define the pathways that exist to surface water. Once these pathways are determined, the

specific mechanisms of natural attenuation for the PU&D Yard VOCs and long term monitoring locations will be determined.

The hydrogeologic factors that are important in attenuating this plume should be defined and quantified to the extent possible to develop a conceptual model that explains and estimates the lifetime of these plumes.

Response: The scope envisioned for the PU&D Yard SAP, coupled with existing data from current and abandoned wells in the area, should help in quantifying the hydrogeologic and geochemical factors influencing plume migration and degradation.

The apparent transport of the PU&D Yard contaminants in the Landfill groundwater intercept system means that management of one impacts the other. It should be determined if there is a breach in the slurry wall and if so, which way the groundwater is flowing. Management of this edge of the plume should be linked to decisions on Landfill management.

We agree that management controls are necessary for the groundwater intercept system. The Environmental Restoration (ER) and Groundwater Programs are in communication with the Landfill Operation Group with respect to the system and associated valves and outfalls. The outfalls are sampled.

The Landfill slurry wall is already buried by a cover that was placed a few years ago. The wells in the covered area are abandoned. It is not advisable to penetrate the landfill cover with additional drilling since the effectiveness of the cover would be compromised. In addition, the Landfill is scheduled to be re-configured again during final capping, which will add to the cover over the slurry wall. Therefore, the Site prefers to focus efforts on monitoring the potential impacts of the Landfill as a whole unit, rather than performing additional investigations of the buried slurry wall.

Management of both the PU&D Yard plume and Landfill closure projects are ER projects. Decisions on management of both of these projects are linked by the Hydrologic Assurance function of the ER Program.